

Amendments to the Specification

Please replace paragraph [0004] with the following amended paragraph:

[0004] Many times, introducer sheaths or cannulas are also splittable. That is, they may be torn apart longitudinally while removed from a patient's body in order to more rapidly remove the sheath, and thus limit blood loss. However, the radiopaque material often inhibits splitting of the introducer sheath, especially when the radiopaque substance is in the form of a solid metal ring. Even coatings applied to a ~~sheath~~ sheath may reduce the sheath's ability to split apart. Thus, many current introducer sheaths compromise between quick removal and detectability via x-rays during procedures.

Please replace paragraph [0007] with the following amended paragraph:

[0007] Generally, the sheath and marker score lines are substantially aligned, in order to permit relatively simultaneous splitting of the marker and the portion of the sheath surrounding the marker. Where a notch is used in lieu of a marker score line, the notch is typically similarly aligned with a sheath score line. Generally, many (although not necessarily all) ~~embodiment~~ embodiments of the cannula and radiopaque marker have two opposing score lines located diametrically opposite one another along the sheath and marker bodies.

Please replace paragraph [0008] with the following amended paragraph:

[0008] In yet another embodiment, the radiopaque marker may be made of two or more discrete radiopaque portions, which may or may not be in direct contact with one another. For example, one embodiment of the radiopaque marker takes the form of two semicircular portions embedded within or affixed to the sheath wall at or near the distal tip. In such an embodiment, neither semicircular portion overlaps or contacts a sheath score line. Instead, the sheath score line or lines run along a gap between the semicircular portions. Accordingly, when the sheath is split, it tears between the radiopaque semicircular portions. This ~~eliminated~~ eliminates the need to actually break or tear through radiopaque material.

Please replace paragraph [0023] with the following amended paragraph:

[0023] The cannula may be split along its longitudinal axis to facilitate removal from a patient's body. Such splitting is generally accomplished by scoring or weakening the sidewall of the cannula in order to provide a tear path along the cannula's longitudinal axis. The scoring may be along the inside or outside walls of the sheath, and typically forms a score line.

Please replace paragraph [0027] with the following amended paragraph:

[0027] Turning now to Fig. 1, a cross-section of a first embodiment of a splittable introducer sheath 10 incorporating a radiopaque marker 12 is depicted. Generally, the sheath is made of a polymer or other material suitable for introduction into a vein, artery, or other portion of a patient's body. The sheath is weakened along its longitudinal axis by at least one score line 20. Generally, such score lines extend substantially from a neck, or other point of attachment to a hemostasis valve (the "proximal end" of the sheath), to the opposite end of the introducer sheath 14 (the "tip" or "distal end" of the sheath). In the cross-section of the embodiment shown in Fig. 1, two score lines run along the sheath interior 16, each approximately opposite one another along the interior wall of the sheath (see Fig. 2) [[, although only one is shown]]. In alternative embodiments, more score lines or grooves may be present, or the score lines may run along the exterior 22 of the sheath.

Please replace paragraph [0029] with the following amended paragraph:

[0029] Extending along the interior of the distal portion of the cannula 10 is an interior tubular element 12 including radiopaque material. This tubular element (the "radiopaque tube") is opaque to x-rays. Typically, the outer diameter of the radiopaque tube is approximately equal to the inner diameter of the cannula. Thus, when the radiopaque tube 12 is placed within the cannula 10, substantially all of the outer wall 24 of the radiopaque tube contacts ~~substantially all of the inner surface 26~~ 16 of the cannula.

Please replace paragraph [0032] with the following amended paragraph:

[0032] Similarly, the distal end 32 of the radiopaque tube 12 may have a curved or shaped outer wall 34, the curve or shape generally corresponding to the form of the lumen 16 or inner wall 16 of the cannula 10. By matching the shapes of the walls, a greater bonding surface between the radiopaque tube 12 and cannula may be achieved.

Please replace paragraph [0034] with the following amended paragraph:

[0034] Herein, the score lines running along the radiopaque tube 12 are referred to as “marker score lines 36” or “radiopaque tube score lines.” The score lines of the radiopaque tube and cannula 10 are typically aligned with one ~~[[another,]]~~ another in order to facilitate splitting the radiopaque tube in the same direction and along the same plane as the cannula. That is, the marker score lines 36 are typically within the plane defined by the score lines 20 of the cannula itself. Further, the radiopaque tube score lines may extend only partially through the radiopaque tube sidewall 38, or may extend entirely therethrough, as shown in Fig. 2. Where the marker score lines 36 extend completely through the radiopaque tube, the score lines may abut the score lines 20 formed on the inner sidewall 16 of the introducer sheath. Where the score lines 36 extend only partially through the radiopaque tube, the score lines may be on the interior 26 or exterior 24 of the tube sidewall 38. Fig. 2 depicts the score lines along the interior of the radiopaque tube sidewall.

Please replace paragraph [0035] with the following amended paragraph:

[0035] Since the radiopaque tube 12 is bonded to a portion of the interior wall 16 of the cannula 10, the radiopaque tube/marker and longitudinal section of the cannula enveloping the marker generally split substantially simultaneously.

Please replace paragraph [0041] with the following amended paragraph:

[0041] In the present embodiment, the radiopaque material is typically embedded within the walls 116 of the sheath 110, rather than bonded to the interior sheath wall 121 ~~116~~, as with the embodiment of Fig. 1. Any of the shapes and configurations discussed herein, however, may be bonded to the interior sheath wall 121 ~~120~~ and are suitable for use with the embodiment of Fig. 1.

Please replace paragraph [0045] with the following amended paragraph:

[0045] In order to facilitate splitting the sheath 110, the present embodiment's radiopaque marker 210 may be grooved, scored, serrated, or provided with a sidewall having weakened or reduced material cross-sections 212 generally corresponding to the location of the score lines 120, grooves, or other splitting means running along the longitudinal axis of the sheath. These various options are collectively referred to as "marker score lines" ~~[[lines,]]~~ 212, and facilitate splitting the radiopaque marker. Generally, because the marker is embedded in the sidewall 116 of the sheath, the marker and portion of the sheath 110 surrounding the marker are split substantially simultaneously. The alignment of the sheath score lines 120 and marker score lines 212 reduce the force necessary to split the distal tip 114 of the sheath. As with previously-discussed embodiments, the marker score lines may be formed on either the interior 214 or exterior 216 of the marker sidewall. Generally, the depression or cavity 218 defined by the marker and/or cannula score lines remains hollow, although alternative embodiments may at

least partially fill in one or more of these score lines with a binding material, polymer, or other element having a weaker resistance to shear stress created when splitting the sheath 110.

Please replace paragraph [0046] with the following amended paragraph:

[0046] In alternative embodiments, a series of overlapping or closely spaced radiopaque markers may be used, instead of a single radiopaque marker ring 210. In such an embodiment, the radiopaque markers lying in a plane defined by a line connecting the sheath score lines 120 may be scored or grooved 212 as described above. In other words, radiopaque markers embedded in the sheath sidewall 116 directly behind the score lines 120 ~~118~~ may also be scored or have a reduced cross-section.

Please replace paragraph [0055] with the following amended paragraph:

[0055] It should be noted that the various embodiments of the cannula 10 and radiopaque marker 12 ~~123~~ discussed herein, and depicted in the various figures, may have a variety of measurements, either standing alone or in relation to one another. For example, the thickness of the lumen sidewall 16 and/or radiopaque markers 12 may vary from embodiment to embodiment, as may the diameter of the lumen. Accordingly, the embodiments shown in the figures are for illustrative purposes only, and should not be construed as depicting exact measurements or relationships between the sizes of various elements of the present invention.

Please replace paragraph [0059] with the following amended paragraph:

[0059] Where the sheath 10 and marker 12 score lines 20, 36 are not immediately adjacent (for example, as shown in Fig. 2 ~~2A~~), both the sheath and radiopaque marker may be scored prior to inserting the marker into the sheath.